

Preface and How to Use this Handbook

John All

As a university instructor of three courses that deal with pest management—a junior/senior undergraduate course in Insect Pest Management, a senior-graduate course in Integrated Pest Management (IPM), and a senior-graduate course in Pesticides and Transgenic Crops—I can use this handbook as a text in all three courses. It will also be useful for university extension specialists and government and industry personnel who deal with regulation, research, sales, utilization, and disposal of insecticides, acaricides, and transgenic crops. Growers and other commodity producers will find this handbook a useful reference. Informed members of the public who want comparative information on common pesticide products that they might use indoors and outside can understand and use this handbook. Professionals in academia, industry, government, and private consulting who work with pest control technologies wrote this handbook as a simple and accurate source of information for a relatively wide audience of people who use pesticide and transgenic crops every day professionally or occasionally around the house and in the garden.

The basic subject matter is intellectually solid and has not changed much in many years. Specific aspects, however, such as the development of new chemistries, changes in regulations, and creation of new transgenic crops, are constantly evolving and specific items are threatened with obsolescence within a few years. Therefore, we have identified many Internet Web sites and other sources of regularly updated information as resources about the changing status of knowledge on insecticides, acaricides, and transgenic crops.

The first section of the handbook is concerned with principles for the proper use of insecticides, acaricides, and transgenic crops. The relevance of these products in managing pests of human enterprise is discussed in the first chapter, which sets a theme for responsible use of chemicals and genetically engineered plants as tools to kill

living creatures that we happen to consider pests. Pesticides and transgenic crops are regulated more than other pest management technologies and laws, especially pertaining to use, and these regulations are discussed in detail in the second chapter. Deployment in IPM is the subject of the third chapter with a discussion of how insecticides, acaricides, and transgenic crops can be blended with other control tactics in a prevention strategy or used to suppress pest outbreaks. Pesticides are used most efficiently when pest populations are characterized and the hazard for damage is quantified. The chapter on pest sampling, economic injury, and action thresholds provides information for pesticide users to survey pest populations to determine whether the application of insecticides or acaricides is warranted.

In the second section of the handbook, we cover the major insecticides and acaricides in use today and provide details on chemistry, toxicology, general uses, etc. The classification scheme in chapter five is based on physiological targeting of molecules as a way of reminding readers that if insecticides and acaricides are not used correctly, they may intoxicate pests and nontarget animals in a similar manner. It was impossible to list all the active ingredients available in each pesticide class, so key commercial molecules or pathogens within each series are discussed as general examples with information on common/scientific and trade names, general pest spectrum, and commodity uses. Other documented attributes for select products are presented, including information on plant-systemicity, translaminar bioactivity, resistance and cross-resistance profile, aspects of environmental toxicology, etc. In chapter six, the authors discuss formulating and packaging pesticides for specified uses on different commodities, and chapter seven discusses application principles.

These chapters stress safety in handling formulated pesticides, introduce application equipment, and discuss important principles of droplet formation, classification, and drift modeling. They also show that applicators can use models to predict droplet size and movement, which is useful in teaching and actual applications.

Insecticide/acaricide resistance is the topic of chapter eight. The biochemical and physiological processes that lead to resistance by pests are discussed as a preamble to developing strategies to mitigate and manage resistance in pest populations. Experiences with practical approaches for resistance detection, monitoring local and regional pest populations, and implementing management strategies are presented with case examples of varying success. The international Insect Resistance Action Committee (IRAC) is the major organization concerned with manag-